

**Ervia's response to the
Eastern & Midland Regional
Assembly's Draft Spatial &
Economic Strategy**

23/01/2019

Ervia

Introduction to Ervia

Ervia is a commercial semi-state company with responsibility for the delivery of gas and water infrastructure and services in Ireland, through Gas Networks Ireland and Irish Water. It also provides dark fibre broadband infrastructure through its business Aurora Telecom.

Gas Networks Ireland develops, operates and maintains the natural gas transmission and distribution networks in Ireland, consisting of 13,954km of gas pipelines. Gas Networks Ireland provides gas transportation services to all gas suppliers and shippers.

Irish Water is the national water utility responsible for providing safe, clean and affordable water and wastewater services to 1.7 million customers in the Republic of Ireland. Irish Water is responsible for the operation of all public water and wastewater services.

These national gas and water utilities underpin the social and economic development of Ireland and will play strategic roles in the transition of Ireland to a low carbon, climate resistant and sustainable economy by 2050.

Overview / Executive Summary

Ervia welcomes the opportunity to respond to the Eastern & Midland Regional Assembly's Draft Regional Spatial & Economic Strategy. Ervia would also like to note that we fully support the submissions and recommendations from Irish Water and Gas Networks Ireland.

1. Natural gas currently plays a significant role in the Eastern & Midland Region's power generation and will continue to do so for the foreseeable future.
2. Natural gas power generation can be decarbonised through Carbon Capture & Storage (CCS) technology.
3. Compressed Natural Gas offers an immediate reduction in emissions for heavy good vehicles & buses.
 - a. These vehicles could then be fully decarbonised via renewable gas.
4. The gas network could play a bigger role in the regions decarbonisation journey.
5. The gas network can reduce carbon dioxide emissions from the residential sector while also improving the air quality in the region.

Climate Change

Ervia welcomes the Eastern & Midlands Regional Assembly's Policy Objectives relating to Climate Change. Ireland is struggling to meet its climate ambitions and our response focuses mainly on how we think the East and Midland region can help Ireland move to a lower carbon economy. Natural gas is a vital energy source for the region and the gas network will continue to support the economic growth and development the region is currently seeing beyond 2050. Ervia, working with Gas Networks Ireland have a vision to unlock a clean energy future and move the gas network to a 'carbon neutral' gas network by 2050, which will drive Ireland and the East and Midlands region to becoming a low carbon economy by 2050.

Decarbonising Electricity Generation

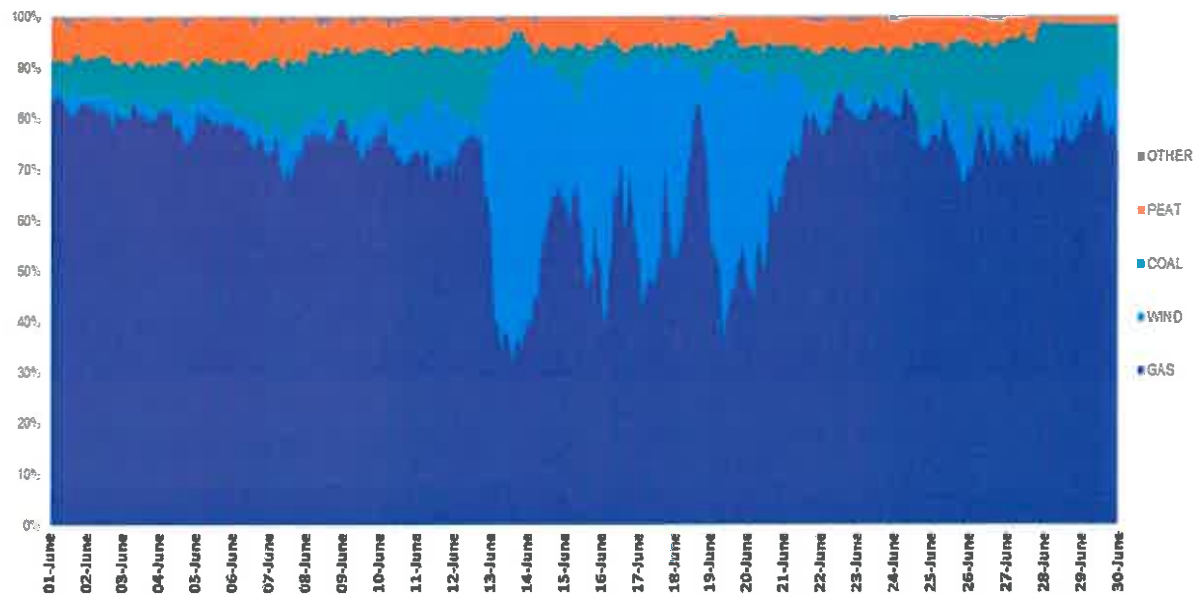
- Natural gas currently plays a significant role in the Eastern & Midland Region's power generation and will continue to do so for the foreseeable future.
- Natural gas power generation can be decarbonised through Carbon Capture & Storage (CCS) technology.
- The Eastern & Midland region is home to four large Combined Cycle Gas Turbines that are critical to supplying electricity to the region.

"The Region will need to shift from its reliance on using fossil fuels and natural gas as its main energy source to a more diverse range of low and zero-carbon sources, including renewable energy and secondary heat sources. Decentralised energy will be critical to the Region's energy supply and will ensure that the Region can become more self-sufficient in relation to its energy needs".

Ervia agree that the region will need to decarbonise its electricity generation and needs to move from carbon intensive fossil fuels to lower emissions fuels in the first instance. Ireland is currently progressing well on this front and is one of the leading countries globally for utilising renewable electricity generation (for example Ireland had a record year for wind installations in 2017 with 532 MW installed). However Ervia disagree that the region needs to move away from natural gas for power generation as this power generation can be decarbonised through Carbon Capture and Storage (CCS) and will be needed to provide essential system services to the electricity grid. These services include backing-up renewable generation such as wind power, when the wind isn't blowing to create electricity.

The current reliance on natural gas fired power generation is clear to see from the image below. When the weather conditions are not right for wind or solar production, Ireland needs a reliable and dependable power generation source like natural gas to ensure the citizens can have electricity when they want it. Also when the weather conditions are favourable for wind generation, it is natural gas generators that are flexible to turn down

their output to complement the increase in wind production. All this can be seen in the image below which shows June 2018 power generation by fuel mix.

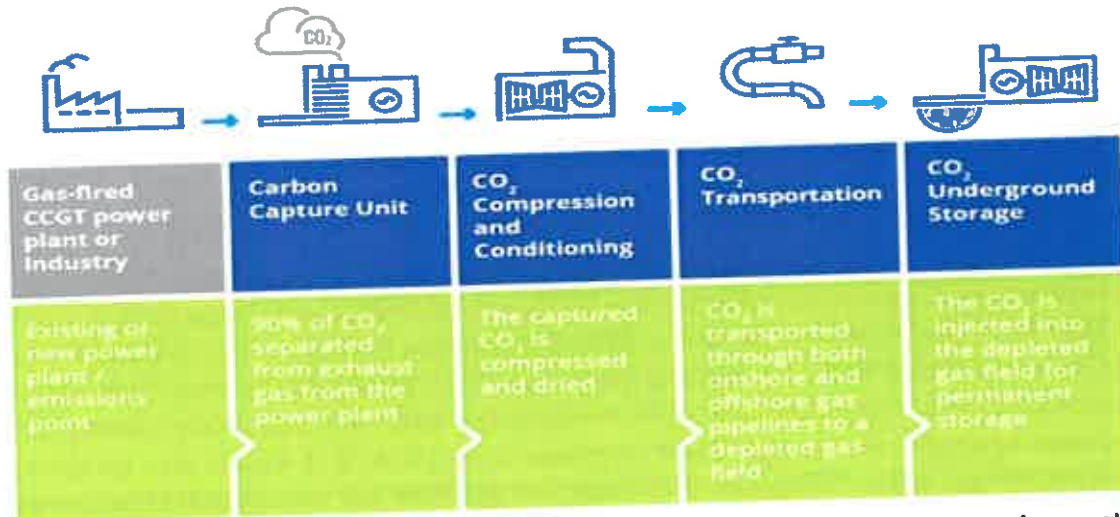


The dark blue shows the electricity produced from natural gas during the month and the light blue shows the wind power generation. As we can see from the picture, there were significantly long periods of time where there was very little electricity produced from wind. We can also see how natural gas supports and matches the output of wind generations. When the wind was blowing strong for a few days, output from natural gas was flexible enough to reduce down quickly. It is clear from this picture that a decarbonised source of on demand generation will be needed.

Ervia believe the perfect partner for renewables in the region, for it to deliver its long term decarbonisation goals and electricity demand, is natural gas + CCS.

What is CCS?

CCS is the process of capturing carbon dioxide from power stations or industrial emitters, transporting it via pipeline (or ships) and injecting it to an underground geological formation (such as a depleted gas field) for permanent storage, which stops it entering the atmosphere and increasing the effects of climate change.



CCS is now widely known and recognised by international bodies such as the International Energy Agency and the Intergovernmental Panel on Climate Change as an essential climate mitigation technology.

"We face an unprecedented challenge in achieving climate objectives. Without CCS, this challenge becomes infinitely greater. Our scenario analysis has consistently highlighted that CCS will be critical for delivering the deep emission reductions needed across fossil fuel-based power and many industrial applications¹"

Since 1972 over 220 million tonnes (MT) of CO₂ have been captured globally by CCS, including approx. 23 MT captured and permanently stored in Norway. There are 18 large scale CCS facilities operating worldwide with over 6500km of CO₂ pipelines operating safely.

Ervia is currently undertaking a feasibility study on the potential to use the Kinsale Gas Field for CCS. CCS technology could also be used in the EMR in the future to help decarbonise power generation and industrial emissions.

¹ [International Energy Agency](#)

Moving to lower emission fuels for power generation

- Peat fired power stations in the region are significant emitters of carbon dioxide and harmful air pollutant sources.
- Natural gas power stations are cleaner, more efficient and better for air quality than peat fired power stations.

The draft Regional Spatial & Economic Strategy also outlines that the region needs to move away from higher carbon polluting fuels for producing electricity. Ervia fully agrees with this position.

“Moving from carbon intense fossil fuel generation to lower emissions fuels”.

Three peat fired power stations are located within the Eastern & Midland Region and these are a significant source of emissions for the region and Ireland. These peat stations in 2017 emitted 2.4 million tonnes² of CO₂. Ervia believe that these plants should only run in times of high demand. Existing natural gas fired power plants often have spare capacity and if they were utilised to create electricity instead of peat power plants, the emission savings could be significant (approximately 1.6MT³). It should also be noted that natural gas is the cleanest burning fossil fuel and does not emit harmful Particulate Matter (PM) when combusted, unlike peat which creates significant harmful air emissions.

Increasing demand for electricity will need low carbon dispatchable technologies

- Demand for electricity in the Eastern & Midland Region is set to increase significantly over the coming years.
- On demand (non-weather reliant power generation such as wind or solar), will be required to supply electricity when required by consumers.

The EMR draft document states:

“An increase in electricity demand is likely resulting not only from increased population and economic development but also resulting from a move away from the use of fossil fuels in the transport sector towards clean mobility”.

EirGrid have also forecasted that there will be a significant increase in the demand for electricity in the Dublin region.

“A key driver for electricity demand in Ireland for the next number of years is the connection of new large energy users, such as data centres... A significant proportion of this extra load will materialise in the Dublin region”⁴.

² [EU verified emissions data for 2017](#)

³ Natural gas in power generation is approximately 67% less carbon intensive than peat

⁴ [EirGrid Generation Capacity Statement 2018](#)

It is vital that electricity is available on demand for the increased population in the region and these new large industrial connections. Any new generation built in the EMR needs to be low-carbon to be suitable for Ireland’s ambition to be a low carbon economy by 2050. Ervia supports renewable electricity generation such as wind and solar but we strongly believe that for the foreseeable future the electricity system will need large thermal generators to back up the system for periods when renewables can’t meet demand due to their weather dependency. It is for this reason Ervia asks the Eastern & Midland Regional Assembly to support any potential CCS project in the region which enhances reliability, significantly reduces emissions in electricity generation and increases security of supply of the regions electricity supply. Large quantities of electricity cannot be stored for long periods of time in an economical manner, therefore a reliable source of electricity production will be needed for the foreseeable future for security of supply.

Woody biomass in power generation

- Biomass for power generation is an expensive, unsustainable and inefficient fuel to create electricity.
- If biomass is to be used to create electricity, it should adopt carbon capture and storage technology to create negative emissions for Ireland.

The draft document states:

“RPO 7.36: A bio-economy plan for the Region should be developed that outlines the capacity of the Region to supply the range of bioenergy resources required for the fuel mix as well as the current and projected consumption requirements for growth in this market”.

Ervia agree that the Eastern and Midland region will play a key role in the development of forestry and Ireland’s bio-economy but is cautioning about the end use of this biomass.

Ervia believe it would be the wrong policy option to propose biomass as a fuel for electricity generation without CCS. Biomass in Ireland is and will be a limited and valuable resource and should be used in the best way possible to reduce emissions for the country.

The Committee on Climate Change in the UK have recently advised the UK government that:

“The UK should not give support to any new large-scale biomass power plants unless they include carbon capture and storage... The reason for this change of direction is that biomass supplies are finite in UK and global terms. In future, this means only the most beneficial uses of biomass should be prioritised⁵”.

It has also been announced in the new UK Clean Air Strategy⁶ that:

⁵ [Carbon Brief article on Committee on Climate Change \(UK\) recommendation](#)

⁶ [UK Clean Air Strategy 2019](#)

“We will consult on making coal to biomass conversions ineligible for future allocation rounds of the contracts for difference scheme”.

Ireland should learn from the UK’s coal to biomass conversions as it is clear to see that they are moving away from it after only a short period of time.

Decarbonising Transport

- Compressed Natural Gas offers an immediate reduction in emissions for heavy good vehicles & buses.
- These vehicles could then be fully decarbonised via renewable gas.

Ervia notes the paragraph in the draft text which states:

“Clean and energy-efficient vehicles play an important role in reducing energy consumption, CO₂ levels and pollutant emissions. Green public procurement policies therefore represent a valuable tool in demonstrating strong leadership, as well as normalising and supporting the uptake of low emission vehicles”.

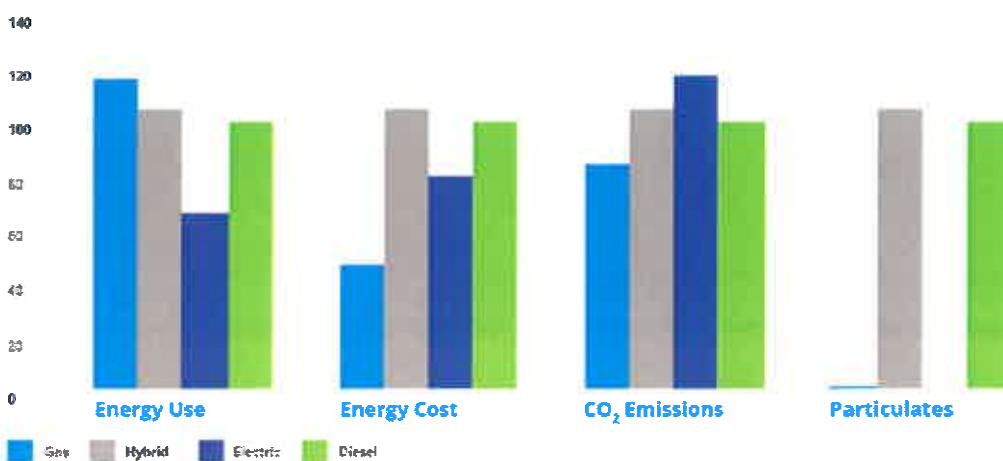
“Full electrification of the national car fleet represents a feasible option for Ireland, where supporting recharging infrastructure is developed”.

Ervia welcomes the draft text supporting the uptake of low emission vehicles and the need to increase the roll out of Electric Vehicle charge points. We also agree that full electrification of the car fleet could be feasible. However for heavy duty vehicles (buses and trucks mainly) and vehicles that need to travel longer distances, Compressed Natural Gas (CNG) offers a decarbonisation solution for these vehicles and Ervia would ask for CNG to be recognised as a key technology to decarbonise the transport sector.

What is CNG?

CNG is a proven technology with over 26 million CNG vehicles in use worldwide (IANGV, 2018). The use of CNG in HGVs can provide an immediate and significant emissions

Comparison of alternatives to diesel vehicles



reduction compared to diesel in this sector. CNG emits 22% less CO₂ than diesel per unit energy. CNG also reduces other harmful emissions including particulate matter. The fine nature of particulate matter means it can get deep into the lungs and bloodstream causing harmful health effects. (EPA US, 2018a). The use of CNG produces 99% less particulate matter than diesel and could therefore significantly enhance Ireland's air quality and reduce serious illnesses.

CNG is a pathway for renewable gas (Bio-CNG) which can further eliminate emissions

By moving the HGV sector to CNG, it will provide a pathway for the use of Bio-CNG as increasing penetrations of renewable gas are transported by the gas network. In the UK, CNG Fuel's Leyland CNG filling station has been supplied with 100% renewable gas (Bio-CNG) since September 2016. On a well to wheel, or lifecycle basis, the CNG vehicles refuelling at Leyland have produced 84% lower CO₂ emissions than equivalent diesel vehicles (Cadent, 2018).

Potential role for hydrogen in the transport sector

- Hydrogen is now seen as a fuel that can help decarbonise difficult areas of the transport sector, such as trains, buses and trucks.

In the longer term, there is potential for hydrogen to play a role in decarbonising transport in the Eastern & Midland Region. For rail transport that is expensive and difficult to electrify, hydrogen fuel cell trains should be considered a credible option and should be assessed for the Eastern & Midland Region which has a high number of diesel commuter and inter-city trains passing through.^{7 8}

Hydrogen is also being trialled globally (and by Dublin Bus⁹) as a carbon free fuel for cars, buses, trucks and ships. Ervia believe hydrogen could play a role in Ireland's journey to a decarbonised economy and could help difficult sectors like heavy transport and long distance applications to decarbonise in the future, which currently have limited options.

⁷ <https://www.alstom.com/press-releases-news/2018/9/world-premiere-alstoms-hydrogen-trains-enter-passenger-service-lower>

⁸ <https://www.telegraph.co.uk/cars/news/hydrogen-fuel-cell-trains-run-british-railways-2022/>

⁹ [Dublin Bus Hydrogen Trial](#)

The Irish gas network

- The gas network currently plays a key role in supplying energy to the Eastern & Midland region and will continue to do so for the foreseeable future.
- The gas network could play a bigger role in the regions decarbonisation journey.

Ervia notes the wording in the draft document which states:

“Having regard to projected population growth and economic growth in the Region it is important that the existing electricity and gas networks can be upgraded to provide appropriate capacity to facilitate development of the Region”.

Ireland has a modern gas network and the network in the Eastern & Midland region can play a greater role in providing residents and businesses access to a cleaner, reliable and soon a renewable fuel. The gas network can also help with the Eastern & Midland regions goal to improve air quality in the region.

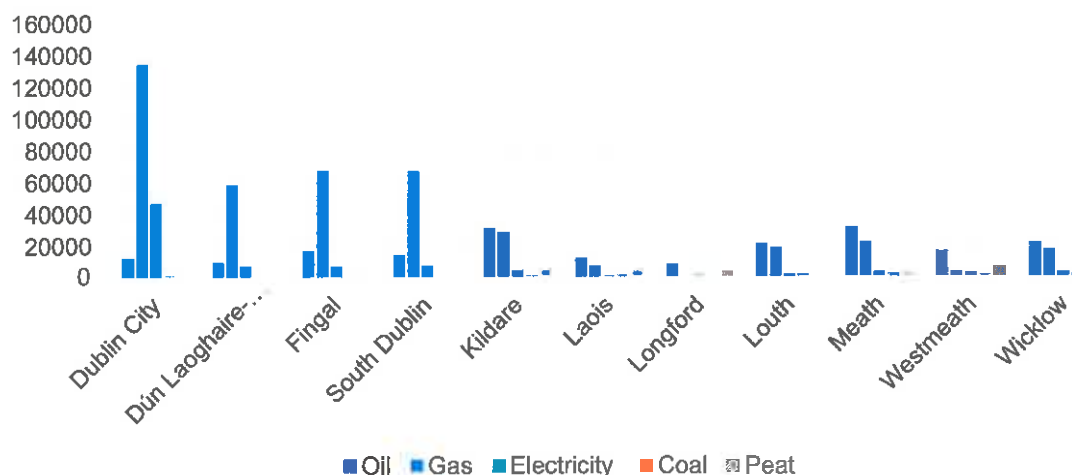
“Air pollution is one of the biggest environmental risks to human health leading to respiratory disease, asthma and lung cancer, and to the environment as sources of air pollution also produce climate pollutants. Particulate matter from the burning of fossil fuels for home heating and nitrogen dioxide from traffic is a leading cause of air pollution in the Region”.

Reducing Particulate Matter from the burning of fossil fuels for home heating

- The gas network can reduce carbon dioxide emissions from the residential sector while also improving the air quality in the region.
- Electrification of heat of the current housing stock in the Eastern & Midland region is extremely expensive, disruptive for the homeowners and decarbonisation of the current housing stock could be achieved by utilising the gas network with minimal cost.

With approximately 800,000 houses in the EMRA region about half of these are already heated by natural gas. Oil heats about 200,000 homes and even more carbon intensive fuels such as coal and peat heat about 40,000 homes in the region¹⁰.

Main heating fuels in the Eastern & Midland Region



Oil, coal, peat and biomass burning in urban areas is a significant contributor to harmful air pollution as highlighted by this NUIG report¹¹ which states:

“In contrast, liquid (oil) and solid fuels (peat, coal and wood) are the potential sources of PM due to emission from incomplete combustion.”

In Ireland, the number of premature deaths attributable to air pollution is estimated at 1,510¹² people and is mainly due to cardiovascular disease. The World Health Organisation (WHO) has described air pollution as the ‘single biggest environmental health risk. Already in Ireland levels of PM2.5 are above health guidelines:

¹⁰ Based on analysis of CSO data

¹¹ [NUIG study on air pollution from the residential sector](#)

¹² [EPA Ireland's Air Pollution](#)

“In Ireland, levels for both PM10 and PM2.5 are above the WHO air quality guidelines values. Bringing the PM levels down below the WHO guideline values will be a challenge, requiring co-operation across a number of sectors.”

By utilising the existing gas network to deliver natural gas in the first instance and then renewable gas to homes that are currently heated by high carbon intensive fossil fuels with no easy or cost effective decarbonisation pathway, there is a clear opportunity to affect significant progress toward emissions targets in a practical, least cost, and least disruptive manner while also significantly enhancing the air quality in the East-Midland region.

The main alternative to utilising the gas network to decarbonise homes is heating homes via electricity and/or woody biomass. Electric heat pumps are currently the proposed option for electrification of heat. However, the installation of heat pump technology requires significant adoption of the heating system relative to gas. Optimal use of heat pump technology requires high levels of insulation which typically requires significant building fabric upgrades which comes with massive disruption for residents. The cost of deep retrofitting Ireland’s existing housing stock could be over €70bn based on an SEAI estimated average cost of €35,000 per house¹³. A similar study by Wales and West Utility in the UK finds the cost could be up to £60,000 per household per year when battery storage costs to balance the grid are accounted for (Wales and West, 2018). A recent episode of Eco Eye on RTE showed two houses receiving a heat pump and deep retrofit. The programme listed the cost as €80,000 per house.

By utilising the gas network and renewable gas this could avoid the need to deep retrofit at least 500,000 homes in the Eastern & Midland region and could avoid over €16bn of spending by residents in the region. A portion of this money could be spent to increase the energy efficiency of the homes converting to the gas network.

Renewable gas in the gas network

- Renewable gas has the exact same characteristics as natural gas, however it is a carbon neutral fuel.
- Ireland has the highest potential per capita for renewable gas production in Europe according to a report from the European Commission.
- By 2030, 20% of Ireland’s current gas demand can be met by renewable gas.

Renewable Gas is biomethane (purified biogas) produced from existing waste streams and a variety of sustainable biomass sources, including grass, animal waste, crop residues and food waste. It is carbon neutral, extremely versatile and fully compatible with existing gas network infrastructure. It is identical in standard to natural gas and can be used for all the same applications. It can be blended with, or can act as a substitute for, natural gas.

¹³ SEAI Deep Retrofit Conference 2017

Gas Networks Ireland will deliver the first renewable gas injection facility in Ireland with Green Generation in Cush, Co. Kildare. The injection facility was commissioned at the end of 2018. The network entry facility for this project is designed to inject up to 108 GWh/annum renewable gas, enough gas for 9,000 homes (GNI NDP, 2018).

Ervia welcomes the wording in the draft document which states:

“...and incorporating circular economy thinking by using anaerobic digesters to produce renewable electricity, heat and gas from farm wastes”.

Renewable gas is an opportunity for farmers to diversify their incomes, reduce emissions in the region and has the potential to employ thousands of people across the country in the sector.

Hydrogen

- Hydrogen has the potential to be a carbon free fuel for the region in the long-term.
- Detailed trials and studies are under way in the United Kingdom looking at the potential for hydrogen as a home heating fuel for millions of homes.
- Trials are ongoing in Dublin into the suitability of hydrogen as a fuel for buses.
- The Eastern & Midland region could, in time, utilise hydrogen for heating, transport and potentially power generation.

Hydrogen is a carbon free gas that can be transported by the existing gas distribution network that can achieve significant decarbonisation of the gas network. Hydrogen in the gas network is not a new concept, as town gas (used in the gas network prior to introduction of natural gas from the 1970s) comprised up to 50% hydrogen. Much like natural gas, hydrogen can be used for heating, transport, industry and power generation as well as being used in the production of other gases. Interest in hydrogen is growing worldwide with numerous projects underway to assess and demonstrate its production, transport and use.

The H21 project led by Northern Gas Networks in the UK is investigating hydrogen for heating domestic and commercial properties, initially for the city of Leeds and more recently the whole North of England.¹⁴

¹⁴ <https://www.northerngasnetworks.co.uk/wp-content/uploads/2017/04/H21-Executive-Summary-Interactive-PDF-July-2016-V2.pdf>

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